

Claims:

1. A method for measuring quality of service (QoS) provided by a network, over which a block of data having at least source and destination addresses included therein is transferred, comprising the steps of:

- 5 a) determining an ingress and an egress of the network based on the source and destination addresses of the block of data;
- 10 b) extracting feature information from the block of data at the ingress and the egress, wherein the feature information identifies the block of data;
- 15 c) determining whether first feature information extracted at the ingress matches second feature information extracted at the egress; and
- 20 d) when the first feature information matches the second feature information, measuring QoS based on a matching pair of the first feature information and the second feature information.

2. The method according to claim 1, wherein at the ingress,

- 20 determining the egress to which the block of data is forwarded from the ingress, based on the source and destination addresses of the block of data; and

sending the first feature information to the egress,
wherein, at the egress, the steps c) and d) are
performed.

3. The method according to claim 1, wherein the step
5 b) comprises the steps of:

stamp the block of data with a first time stamp
at the ingress; and

stamp the block of data with a second time stamp
at the egress.

10 wherein, in the step d), QoS is measured based on
the first and second time stamps of the matching pair.

4. The method according to claim 1, further comprising
the steps of:

registering the feature information extracted from
15 the block of data and its registration time into a buffer;
when a matching pair is found in the step c), deleting
feature information corresponding to the matching pair from the
buffer; and

when feature information is left in the buffer after
20 a predetermined lifetime expires, processing a block of data
identified by the feature information as being lost.

5. The method according to claim 1, further comprising
the step of:

determining whether the block of data is targeted for QoS measurement at the ingress and the egress,

wherein, only when the block of data is targeted for QoS measurement, the step b) is performed.

5 6. A system for measuring quality of service (QoS) provided by a network, over which a block of data having at least source and destination addresses included therein is transferred, comprising:

10 a feature information extractor for extracting feature information from the block of data at an ingress and egress of the network, which are determined based on the source and destination addresses of the block of data, wherein the feature information identifies the block of data;

15 a matching detector for detecting a matching pair of first feature information extracted at the ingress and second feature information extracted at the egress; and

20 a quality measuring section for measuring QoS based on the matching pair of the first feature information and the second feature information.

7. The system according to claim 6, further comprising:

a determiner for determining the egress to which the block of data is forwarded from the ingress, based on the source and destination addresses of the block of data at the ingress; and

a feature information sender for sending the first feature information to the egress.

wherein the quality measuring section at the egress measures QoS based on the matching pair.

5 8. The system according to claim 6, further comprising: a time stamper for stamping the block of data with a first time stamp at the ingress and with a second time stamp at the egress,

wherein the quality measuring section at the 10 egress measures QoS based on the first and second time stamps of the matching pair.

9. The system according to claim 6, further comprising: a buffer for registering the feature information extracted from the block of data and its registration time; and 15 a controller for deleting feature information corresponding to the matching pair from the buffer when a matching pair is found,

wherein, when feature information is left in the buffer after a predetermined lifetime expires, the 20 quality measuring section processes a block of data identified by the feature information as being lost.

10. The system according to claim 6, further comprising: a target determiner for determining whether the

block of data is targeted for QoS measurement at the ingress and the egress.

wherein, only when the block of data is targeted for QoS measurement, the block of data is output to the feature information extractor.

11. A method for measuring quality of service (QoS) provided by a network, over which a block of data having at least source and destination addresses included therein is transferred, comprising the steps of:

10 at an ingress where a first block of data flows into the network,

a) extracting first feature data from the first block of data, wherein the first feature data identifies the first block of data;

15 b) determining an egress where the first block of data is to flow from the network, based on source and destination addresses of the first block of data;

c) sending the first feature data to the egress;

at the egress,

20 d) receiving the first feature data from the ingress;

e) extracting second feature data from a second block of data flowing from the network, wherein the second feature data identifies the second block of data;

25 f) comparing the second feature data with the first

feature data to determine whether the second block of data is identical to the first block of data; and

g) when it is determined that the second block of data is identical to the first block of data, computing QoS based 5 on the first and second feature data.

12. The method according to claim 11, wherein, in the step b), the egress is determined by referring to network configuration data indicating a correspondence between each ingress node and each egress node in the network.

10 13. The method according to claim 12, wherein the network configuration data further indicates a correspondence between each ingress node and each egress node via at least one via-point node in the network.

14. The method according to claim 13, further comprising 15 the steps of:

at each of the at least one via-point node,

h) extracting third feature data from a third block of data passing through the via-point node, wherein the third feature data identifies the third block of data;

20 i) determining an egress where the third block of data is to flow from the network, based on source and destination addresses of the third block of data; and

j) sending the third feature data to the egress.

15. The method according to claim 13, further comprising the steps of:

at a via-point node.

5 h) receiving the first feature data from the ingress;

i) extracting third feature data from a third block of data passing through the via-point node, wherein the third feature data identifies the third block of data;

10 j) comparing the third feature data with the first feature data to determine whether the third block of data is identical to the first block of data; and

15 k) when it is determined that the third block of data is identical to the first block of data, computing QoS based on the first and third feature data.

16. The method according to claim 14, further comprising the steps of:

at the egress,

20 k) receiving the third feature data from each of the at least one via-point node;

l) when it is determined that the second block of data is identical to the first block of data, comparing the third feature data with the first feature data to determine whether the third block of data is identical to the first block of data; and

m) when it is determined that the third block of data for each of the at least one via-point node is identical to the first block of data, computing QoS based on the first, second and third feature data.

5 17. A measuring probe for measuring quality of service (QoS) provided by a network, over which a block of data having at least source and destination addresses included therein is transferred, wherein a plurality of measuring probes are provided at edge nodes in the network, the measuring probes being 10 interconnected to each other, comprising:

 a first feature data extractor for extracting first feature data from a first block of data flowing into the network, wherein the first feature data identifies the first block of data;

15 a destination discriminator for determining an exit measuring probe at a point where the first block of data is to flow from the network, based on source and destination addresses of the first block of data;

 a feature data sender for sending the first feature data to the exit measuring probe;

 a feature data receiver for receiving second feature data from another measuring probe, wherein the second feature data identifies a second block of data which flowed into the network at the other measuring probe;

25 a second feature data extractor for extracting third

feature data from a third block of data flowing from the network, wherein the third feature data identifies the third block of data;

5 a comparator for comparing the third feature data with the second feature data to determine whether the third block of data is identical to the second block of data; and

a QoS calculator for calculating QoS based on the second and third feature data when it is determined that the third block of data is identical to the second block of data.

10 18. A measuring system for measuring quality of service (QoS) provided by a network composed of a plurality of sub-networks, through which a block of data having at least source and destination addresses included therein is transferred, comprising:

15 a plurality of measuring probes connected to respective ones of the first edge node, the second edge node, and at least one via-point node, the measuring probes being interconnected to each other,

wherein each of measuring probes connected to
20 respective ones of the first and second edge nodes comprises:

a first feature data extractor for extracting first feature data from a first block of data flowing into the network, wherein the first feature data identifies the first block of data;

25 a destination discriminator for determining an

egress measuring probe at which the first block of data is to flow from the network and a via point measuring probe connected to a via-point node through which the first block of data is to pass, based on source and destination addresses of the first 5 block of data;

a feature data sender for sending the first feature data to the egress measuring probe and the via-point measuring probe;

a first feature data receiver for receiving second feature data from an ingress measuring probe, wherein the second feature 10 data identifies a second block of data which flowed into the network at the ingress measuring probe;

a second feature data extractor for extracting third feature data from a third block of data flowing from the network, wherein the third feature data identifies the third block of 15 data;

a first comparator for comparing the third feature data with the second feature data to determine whether the third block of data is identical to the second block of data; and

a first QoS calculator for calculating QoS based on the 20 second and third feature data when it is determined that the third block of data is identical to the second block of data, and

a via point measuring probe connected to each of the at least one via-point node, comprises:

25 a third feature data extractor for extracting fourth feature data from a fourth block of data passing the via-

point node, wherein the fourth feature data identifies the fourth block of data;

5 a second feature data receiver for receiving fifth feature data from the ingress measuring probe, wherein the fifth feature data identifies a fifth block of data which flowed into the network at the ingress measuring probe;

a second comparator for comparing the fourth feature data with the fifth feature data to determine whether the fourth block of data is identical to the fifth block of data; and

10 a second QoS calculator for calculating QoS based on the fifth and fourth feature data when it is determined that the fifth block of data is identical to the fourth block of data.

19. A measuring system for measuring quality of service (QoS) provided by a network composed of a plurality of 15 sub-networks, through which a block of data having at least source and destination addressees included therein is transferred, comprising:

a plurality of measuring probes connected to respective ones of the first edge node, the second edge node, 20 and at least one via-point node, the measuring probes being interconnected to each other,

wherein each of measuring probes connected to respective ones of the first and second edge nodes comprises:

25 a first feature data extractor for extracting first feature data from a first block of data flowing into the network,

wherein the first feature data identifies the first block of data;

5 a first destination discriminator for determining an egress measuring probe at which the first block of data is to flow from the network and a via-point measuring probe connected to a via-point node through which the first block of data is to pass, based on source and destination addresses of the first block of data;

10 a first feature data sender for sending the first feature data to the egress measuring probe and the via-point measuring probe;

15 a feature data receiver for receiving second feature data from one of an ingress measuring probe and a via-point measuring probe, wherein the second feature data identifies a second block of data which captured at a corresponding one of the ingress measuring probe and the via-point measuring probe;

a first buffer for storing the second feature data for the ingress measuring probe;

20 a second buffer for storing the second feature data for the via-point measuring probe;

a second feature data extractor for extracting third feature data from a third block of data flowing from the network, wherein the third feature data identifies the third block of data;

25 a comparator for comparing the third feature data with the second feature data to determine whether the third block

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of data is identical to the second block of data; and
a QoS calculator for calculating QoS based on the second
and third feature data when it is determined that the third block
of data is identical to the second block of data, and

5 a via-point measuring probe connected to each of the
at least one via-point node, comprises:

a third feature data extractor for extracting fourth
feature data from a fourth block of data passing the via-
point node, wherein the fourth feature data identifies the
10 fourth block of data; and

a second feature data sender for sending the fourth feature
data to the egress measuring probe.

20. The measuring system according to claim 19, wherein
the comparator first compares the third feature data with the
15 second feature data stored in the first buffer and then the third
feature data with the second feature data stored in the second
buffer.